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# Cognitive Coping and Goal Adjustment After First-Time Myocardial Infarction: Relationships With Symptoms of Depression

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*The authors studied the relationships among cognitive coping strategies, goal adjustment processes (disengagement and reengagement), and depressive symptomatology in a sample of 139 patients who had experienced a first-time acute myocardial infarction between 3 and 12 months before data assessment. They assessed cognitive coping strategies, goal adjustment, and depressive symptoms by the Cognitive Emotion Regulation Questionnaire, the Goal Obstruction Questionnaire, and the Hospital Anxiety and Depression Scale, respectively. Main statistical methods were Pearson correlations and multiple regression analyses. Results show significant associations among the cognitive coping strategies of rumination, catastrophizing, and higher depressive symptoms, as well as among positive refocusing, goal reengagement, and lower depressive symptoms. This suggests that cognitive coping and goal reengagement strategies may be useful targets for intervention.*

**Index Terms:** adjustment, cognitive coping, depression, myocardial infarction

The experience of a first-time acute myocardial infarction (MI) is a traumatic event and may influence well-being for a significant time period. Substantial rates of depression have been demonstrated in patients after an acute MI.<sup>1</sup> Research has shown depression after an MI to increase the risk of cardiac complications and mortality.<sup>2,3</sup> Given the prevalence of depression and other mental health problems in this group and their associations with post-MI mortality, it is important to identify (modifiable) psychological risk

factors associated with maladjustment of individuals after an MI. One such factor is coping. There is increasing evidence that (ongoing) psychological distress in response to life stressors such as chronic diseases or an MI is associated with maladaptive coping.<sup>4,5</sup> Information about the adaptability of specific coping strategies may provide important clues for the identification of patients with increased risk of depression and for a more effective treatment.

An important coping factor that has been shown to play a vital role in the development of emotional problems after exposure to stressful health-related experiences is the cognitive coping strategies that people use to deal with a traumatic event.<sup>6-8</sup> *Cognitive coping* or *cognitive emotion regulation strategies* can be defined as the conscious mental strategies individuals use to handle the intake of emotionally arousing information.<sup>7,9</sup> A cognitive coping strategy that research has repetitively shown to be associated with higher levels of depression is rumination.<sup>10</sup> *Rumination* can be described as the tendency to think repetitively and

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passively about one's (negative) feelings and thoughts.<sup>11</sup> A ruminative way of thinking has also been linked to poorer well-being in people with a chronic disease such as cancer.<sup>12,13</sup> Some research has found a relationship between rumination and cardiovascular diseases.<sup>14</sup> Also, research has shown a catastrophizing cognitive strategy (i.e., a strategy of exaggerating the terror of an experience) to be related to maladaptation, emotional distress, and depression in general,<sup>7</sup> particularly in people with chronic pain complaints.<sup>15</sup> It has also been associated with emotional distress in people with cardiovascular diseases.<sup>16</sup> Other cognitive strategies such as positive reappraisal (attaching a positive meaning to the event in terms of personal growth) and positive refocusing (referring to thinking about joyful and pleasant issues instead of thinking about the negative experience) have been found to be related to lower levels of depressive symptoms in general population samples as well as in people with a chronic disease.<sup>7,8,13,17–20</sup> Researchers have found conflicting research results with regard to other cognitive strategies such as acceptance, self-blame, planning, other-blame, and putting into perspective.<sup>7</sup> No studies are available that examined the relationships between cognitive coping strategies and psychological adjustment in patients who have experienced a recent MI.

A second important coping factor that research has shown to play an important role in the development of emotional problems after a stressful medical event is *goal adjustment*, or the way individuals deal with the goal frustrations associated with the disease.<sup>21,22</sup> Experiencing a first-time MI may impose high levels of stress on the individual because people who have had an MI have to cope not only with the emotions of the stressful life event itself, but also with more limited physical functioning, lifestyle changes, and associated goal frustrations. Researchers have therefore suggested that to better understand the process of coping with a medical event such as an MI, the influence or obstruction of personal goals should be taken into account.<sup>4,21,22</sup> From the perspective of self-regulation theory,<sup>22,23</sup> people tend to strive for the attainment of personal goals. Goals are believed to give people a sense of meaning and identity and to be of great importance for psychological well-being.<sup>24,25</sup> People have personal goals in a number of life areas, the most important being health, work, domestic or caring tasks, social relationships, and leisure activities. Psychological distress may arise when a person cannot attain or maintain his or her desired goals in 1 or more of these areas. Former studies have not only shown that experiencing an MI may lead to a variety of goal disturbances, but also that the extent to which goal disturbances are experienced in response to an MI is strongly

related to the reporting of depressive symptomatology.<sup>21</sup> It has been suggested that to restore one's well-being in such circumstances, it may be adaptive to disengage; that is, to withdraw effort and commitment from unattainable goals and to reengage in alternative meaningful goals. Such goal adjustment in terms of goal disengagement and goal reengagement has been associated with a better psychological well-being, less depression, and a greater sense of purpose in life.<sup>26</sup>

At present, no studies have focused on the joint influence of cognitive coping and goal adjustment processes on symptoms of depression after an MI, despite the importance this information could have for identifying patients with increased risk of developing depression and for providing targets for intervention. Therefore, our aim in the present study was to examine the relationships among cognitive coping strategies, goal adjustment processes (disengagement and reengagement), and depressive symptomatology after a first-time MI (experienced 3–12 months before this study was carried out). The analyses controlled for sex, age, and time passed since MI, as well as for severity of physical limitations. We hypothesized that after controlling for these variables, significant relationships would be found between symptoms of depression and the cognitive coping strategies of rumination, catastrophizing, positive reappraisal, and positive refocusing (the latter 2 inversely), as well as among depression, goal disengagement, and goal reengagement.

## METHODS

### Sample

We performed patient inclusion in the period between September and November of 2006. The sample comprised 139 patients (114 male, as female), ranging in age from 35 to 70 years ( $M$  age = 56.39 years,  $SD$  age = 8.19 years). All patients had experienced a first acute MI and had been subjected to a primary Percutaneous Coronary Intervention (PCI) between 3 and 12 months before data assessment in the cardiology outpatient clinic of the Onze Lieve Vrouw Gasthuis (OLVG) in Amsterdam, the Netherlands. (PCI, also known as [coronary] angioplasty, is a nonsurgical therapeutic procedure used to treat the narrowed coronary arteries of the heart found in coronary heart disease: A catheter is used to place a stent to open up blood vessels in the heart that have been narrowed by plaque buildup, a condition known as *atherosclerosis*.)

With regard to the background variables, 75.4% of participants were married or lived with a partner, 7.2% were unmarried, 14.5% were divorced, 1.4% were widowed, and 1.4% did not specify their status. With regard to

education level, 15.2% of participants indicated primary school as their highest form of completed education, 15.9% had completed lower vocational education (3 years of secondary education), 15.8% had completed lower general secondary education (4 years of secondary education), 24.6% had completed intermediate vocational education (continuing education after finishing lower vocational or lower general secondary education), 6.5% had completed higher general secondary or preuniversity education (5 and 6 years of secondary education, respectively), and 21.7% had completed higher vocational university or education.

## Procedure

We obtained permission for the study from the Medical Ethics Committee and selected patients from a database of the cardiology outpatient clinic of the OLVG in Amsterdam, the Netherlands. The original database consisted of 410 patients who had been admitted to the OLVG with an MI and who had—for that reason—been subjected to a PCI in the period between 3 and 12 months preceding data assessment. We made a further selection by excluding people older than 70 years of age ( $n = 156$ ). Of the remaining 254 patients, 1 patient died, and contact information was not available for 7 patients. The remaining 246 patients were contacted by phone and given information about the study and invited to participate. In total, 238 patients agreed to participate. These 238 patients received a written questionnaire to be filled in and sent back. Patients were also asked to carefully read, sign, and send back an informed-consent form. Filling in the questionnaire took about 25 minutes. Two weeks later, a reminder was sent. In total, 160 completed questionnaires were returned, giving a response rate of 65%. For the purpose of the present study, a further selection was made of patients who had had a first-time MI. In total, 139 patients fulfilled this criterion. For ethical reasons, we were not able to investigate whether those who participated differed from those who did not participate.

## Instruments

### *Physical Limitations*

We measured the severity of health-related or physical limitations by using the physical functioning subscale (PF-10) of the Medical Outcomes Study Short Form (MOS-SF 36).<sup>27</sup> The PF-10 comprises 10 items that assess the extent of health-related limitations in a variety of physical activities. Items are scored on 3-point Likert-type scales ranging from 1 (*no, not limited at all*) to 3 (*yes, limited a lot*).

A total score is obtained by summing up the 10 items (10–30). Higher scores indicate more severe health-related

limitations. Reliability and validity of the PF-10 are supported by various studies.<sup>27</sup> In the present study, an alpha reliability of .93 was found.

### *Depression*

We measured symptoms of depression by using the Hospital Anxiety and Depression Scale (HADS). The HADS is a 14-item self-report screening scale originally designed to assess the presence of anxiety and depressive states in the setting of a medical out-patient clinic.<sup>28</sup> The HADS contains 2 subscales, 1 for anxiety and 1 for depression. For the purpose of the present study, only the depression subscale was used. It comprises 7 items scored on 4-point Likert-type scales ranging from 0 to 3 with varying scoring instructions; a total score is obtained by summing up the 7 items (4–28). Higher scores indicate higher symptoms of depression. Reliability and validity have been shown to be good.<sup>29</sup> In the present study, an alpha reliability of .86 was found.

### *Goal Disengagement and Reengagement*

We measured goal disengagement and reengagement by using the Goal Obstruction Questionnaire (GOQ). The goal disengagement and reengagement subscales each comprised 4 items reflecting disengagement and reengagement efforts in 4 specific domains: work, domestic or caring tasks, social relationships, and leisure activities. More specifically, the 4 items of the disengagement scale assess the extent to which one considers oneself able to withdraw effort and commitment from unattainable goals on each of the 4 domains in the case that preexisting goals are no longer reachable on that specific domain. Likewise, the goal-reengagement items measure the extent to which one considers oneself able to reengage in alternative meaningful goals in the case that preexisting goals are no longer reachable on the specific domain. Items are scored on 5-point Likert-type scales ranging from 1 (*not at all*) to 5 (*certainly*). Total scores are obtained by summing up items, yielding total scores of 4–20. Higher scores indicate more goal disengagement and more reengagement, respectively. Alpha reliabilities were .89 and .85, respectively.

### *Cognitive Coping*

To measure the specific cognitive coping strategies participants used in response to their MI, we used the Cognitive Emotion Regulation Questionnaire (CERQ).<sup>30</sup> The CERQ is a 36-item questionnaire consisting of the following 9 conceptually distinct subscales, each comprising 4 items and each referring to what one thinks after the experience of a stressful life event: self-blame, other-blame, rumination,

catastrophizing, putting into perspective, positive refocusing, positive reappraisal, acceptance, and planning.

The CERQ can be used to measure either a more general cognitive coping style or a more specific cognitive response to a specific event. In the present study, we used the latter approach. Respondents were asked which current cognitive emotion regulation strategies they used in relation to their MI. Cognitive emotion regulation strategies were measured on a 5-point Likert-type scale ranging from 1 (*almost never*) to 5 (*almost always*). Individual subscale scores were obtained by summing up the scores belonging to the particular subscale (ranging from 4 to 20). Previous research on cognitive emotion regulation strategies has shown that all subscales have good psychometric properties.<sup>30</sup> In the present study, alpha reliabilities of the 9 CERQ scales ranged from .76 to .88.

### Statistical Analysis

We calculated the means, standard deviations, range of scores, alpha reliabilities, and Pearson correlations of all study variables. To avoid multicollinearity problems with multiple regression analysis (MRA), we paid special attention to the mutual correlations among variables that were significantly correlated with depressive symptoms. If variables appeared to have significant correlations with depression as well as high, significant mutual correlations (.60 and greater), multicollinearity problems were expected.

We performed an MRA with depression as the dependent variable and the other variables as independent variables.

A preselection was made of the variables by only including those variables that were significantly correlated with depression. In the case of expected multicollinearity, an MRA was performed twice, including only 1 of the correlated predictors at a time. Background variables were included in the MRA, independent of the significance of their correlations with depression. An MRA was performed in 3 steps (method: forced entry). In the first step, the background variables of sex, age, and time passed since MI were included as predictors. In the second step, the background variable concerning severity of physical limitations was added. In the third step, the cognitive coping and goal adjustment variables that had significant bivariate correlations with the outcomes were added.

## RESULTS

### Study Characteristics and Correlations

Table 1 presents the means, standard deviations, ranges, and alpha reliabilities of the study variables. Table 2 presents Pearson correlations among all study variables. Depression showed significantly positive correlations with severity of physical limitations, rumination, catastrophizing, and other-blame, which indicates that higher scores on these scales were related to higher depression scores. Significantly negative correlations with depression were found for goal disengagement, goal reengagement, positive refocusing, and positive reappraisal, which relates higher

**TABLE 1. Psychometric Properties of the Study Variables**

Variable	<i>M</i>	<i>SD</i>	Reported range	Scale range	Direction (higher scores)	$\alpha$
Depressive symptoms (HADS)	4.12	4.19	0–17	0–21	More symptoms	.86
Physical limitations (MOS-SF)	14.19	4.57	10–30	10–30	More limitations	.93
Goal disengagement	11.46	4.28	4–20	4–20	More disengagement	.89
Goal reengagement	12.53	4.29	4–20	4–20	More reengagement	.85
Self-blame	7.09	3.57	4–20	4–20	Higher use	.88
Acceptance	10.99	3.91	4–20	4–20	Higher use	.78
Rumination	8.12	3.39	4–19	4–20	Higher use	.83
Positive refocusing	11.47	4.00	4–20	4–20	Higher use	.79
Planning	9.80	3.55	4–20	4–20	Higher use	.76
Positive reappraisal	9.86	3.98	4–20	4–20	Higher use	.81
Putting into perspective	11.82	4.01	4–20	4–20	Higher use	.80
Catastrophizing	5.52	2.34	4–14	4–20	Higher use	.78
Other-blame	4.64	1.82	4–16	4–20	Higher use	.83

Note. HADS = Hospital Anxiety and Depression Scale; MOS-SF = Medical Outcomes Study–Short Form.



**TABLE 2. Correlations Among Study Variables (N = 139)**

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Depression	—															
2. Time (months ago)	.07	—														
3. Age	.02	.25**	—													
4. Gender	-.06	.03	.04	—												
5. Physical limitations	.45***	.09	.17*	.14	—											
6. Goal disengagement	-.21*	.16	.13	-.01	-.08	—										
7. Goal reengagement	-.44***	-.05	.08	-.01	-.26**	.44***	—									
8. Self-blame	.12	-.06	-.19	-.12	-.12	-.06	-.16	—								
9. Acceptance	.01	-.16	-.09	-.22**	-.01	.01	.01	.43***	—							
10. Rumination	.44***	-.10	-.06	-.07	-.44***	-.34***	-.22**	.37***	.40***	—						
11. Positive refocusing	-.33***	-.09	.15*	-.10	.33***	-.01	.24**	.12	.33***	.02	—					
12. Planning	.15	-.11	-.07	-.13	-.15	-.17*	.01	.40***	.56***	.59***	.34***	—				
13. Positive reappraisal	-.21*	-.16**	.00	-.08	.21*	.10	.26**	.27***	.50***	.24**	.51***	.54***	—			
14. Putting into perspective	-.12	-.13	.09	-.15	.12	-.05	.05	.35***	.69***	.19*	.58***	.51***	.66***	—		
15. Catastrophizing	.44***	-.04	-.07	-.08	-.44***	-.20*	-.26**	.17*	.10	.60***	-.12	.28**	.06	.06	—	
16. Other-blame	.26**	-.01	-.02	-.10	.26**	-.06	-.13	.12	.06	.18*	.00	.16	.05	.06	.25**	—

\*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ .

scores on these scales to lower depression scores. Correlations among the other study variables ranged from  $-.44$  (physical limitations and rumination/catastrophizing) to  $.69$  (acceptance and putting into perspective).

On the basis of the correlations, potential multicollinearity problems were expected for the variables rumination and catastrophizing (high mutual correlation of  $.60$  as well as high correlations with outcomes). Because of these expected multicollinearity problems for rumination and catastrophizing, an MRA was performed twice, each including only 1 of the 2 variables at a time.

### Relationships Among Goal Adjustment, Cognitive Coping, and Depression: MRA

First, an MRA with depression as the outcome was performed with catastrophizing as the predictor. In the first step—in which gender, age, and time passed since MI were entered as independent variables—the percentage of explained variance was 1% (nonsignificant). In the second step—in which severity of physical limitations was added to the background variables—the percentage of explained variance increased to 18%. In the third step, the cognitive coping and goal adjustment variables were added, increasing the explained variance to 42%. In the final model (see Table 3), severity of physical limitations had a significant beta effect of  $.30$ , relating more severe physical limitations to more depressive symptoms. In addition, goal reengagement had a significant effect of  $-.25$ , whereas disengagement from

**TABLE 3. Relationships Among Physical Limitations, Goal-Related Variables, Cognitive Coping, and Depressive Symptoms: MRA Results Corrected for Time, Age, and Gender**

Variable	Depressive symptoms		
	$\beta$	$t$	$p$
Background variables			
Time (months ago)	.02	0.27	ns
Age	.05	-0.67	ns
Gender	-.05	0.63	ns
Physical limitations	.30	3.87	.000
Goal-related variables			
Goal disengagement	-.01	-0.06	ns
Goal reengagement	-.25	-2.94	.004
Coping variables			
Catastrophizing/ Rumination	.26/.33	3.35/4.31	.001/.000
Positive refocusing	-.23	-2.56	.012
Positive reappraisal	-.02	-0.17	ns
Other-blame	.08	1.01	ns
Adj $R^2$ (Catastrophizing/ Rumination)	.42/.45		

Note. Multiple regression analysis (MRA) was performed twice, including either catastrophizing or rumination as independent variable (not both) because of the expected multicollinearity problems. The presented  $\beta$  coefficients of the predictors correspond to the results of the analyses with catastrophizing. Although the height of the  $\beta$  coefficients in the analyses with rumination slightly differed from the presented coefficients, the significance of the coefficients without exception remained invariant.

goals was nonsignificant. Significant effects were also found for catastrophizing (.26) and positive refocusing (–.23). The MRA was repeated with rumination instead of catastrophizing, yielding a significant effect for rumination (.33) and invariant significances for the other coefficients.

## DISCUSSION

Our aim was to study the joint influence of cognitive coping and goal adjustment strategies (ie, disengagement from unattainable goals and reengagement in alternative meaningful goals) on symptoms of depression after the experience of a first-time MI. The results showed that both cognitive coping and goal adjustment strategies in response to an MI were important issues in relation to depression, over and above the influences of sex, age, time passed since MI, and the reported severity of physical limitations.

The findings concerning cognitive coping showed that a significant percentage of the variance in the reporting of current depressive symptomatology was explained by the use of specific cognitive strategies in response to the MI. More specifically, depressive symptomatology had significant relationships with the cognitive strategies of rumination, catastrophizing, and positive refocusing (the latter inversely), supporting our hypotheses. These findings correspond not only with findings from general population studies that have consistently demonstrated strong relationships among these 3 strategies and depressive symptoms,<sup>8,10,15,19,31</sup> but also with a recent study in cancer patients showing strong relationships among the same cognitive strategies (ie, rumination, catastrophizing, and positive refocusing) and psychological well-being.<sup>13</sup> The present study is the first to demonstrate that these conclusions are also true for an MI patient sample. The study only partly supports the expectation concerning the relationship between positive reappraisal and depression. The bivariate correlation between these variables and the outcomes was significant and in the predicted direction. In the MRA, however, it did not reach the level of significance. Although suggested by the results of the present study, it is too early to conclude that the other 3 cognitive strategies are of more importance to well-being than is positive reappraisal. Other studies should be performed to replicate this result.

The findings concerning goal adjustment showed that in addition to the variance explained by the control variables and the aforementioned cognitive coping strategies, a significant effect was found for goal reengagement, which supported the hypothesis concerning this variable. However, the hypothesis concerning goal disengagement was only partly supported. Although goal disengagement did have a significant bivariate correlation with the outcomes,

it did not reach the level of significance after controlling for the other variables. This finding corresponds with the findings in the cancer patient study of Schroevers and colleagues<sup>13</sup> in which psychological well-being was also more strongly related to goal reengagement than to goal disengagement. Also, other researchers have noted that goal disengagement and goal reengagement could be considered as relatively independent processes.<sup>22,26</sup> It might be assumed that regardless of whether a person disengages from his or her unattainable goals, the pursuit of other new, meaningful goals is of high importance for well-being. A person may disengage from an unattainable goal before pursuing a new goal or, alternatively, a person may seek and reengage in new goals without disengaging from an unattainable goal first. However, on the basis of the present results we cannot conclude that the letting go of unattainable goals is not of importance or of less importance for psychological well-being. An explanation for the relatively weak relationship between goal disengagement and well-being may be that the adaptive aspects of goal disengagement are more complex to study. For example, in our study we could not distinguish between patients who rightfully let go of unattainable goals and those who withdrew effort too quickly from goals that may have been attainable. Likewise, for some people not disengaging from unattainable goals may reflect a healthy tendency to maintain hope, whereas for others it may reflect an unhealthy rigid tendency. In addition, we did not have information on exactly which goals cancer patients had to give up. It can be hypothesized that disengaging from more important higher order goals, such as maintaining a sense of autonomy or competence, is more troublesome than disengaging from more concrete lower level goals, such as doing physical exercises every week. All these avenues should be explored by future studies, in order to be able to draw more firm conclusions on the relative importance of disengaging from unattainable goals.

A limitation of the study design was that the detection of depressive symptoms as well as the assessment of cognitive coping and goal adjustment strategies had to be made on the basis of self-reported evaluations, which may have caused some bias. Future studies should also use other forms of data collection, such as personal interviews. In addition, our sample comprised patients who had all experienced an MI and had all undergone a PCI. For example, the extent to which they had a prior history of depression or elevated depression scores before the MI was unknown. Obtaining such information in future studies is important. Another limitation is the generalizability of the study results. One example of this is that the sample only consisted of MI

patients who had undergone PCI treatment in the 3–12 months that preceded the study. Another example is that we had a nonresponse rate of 35% and—because of ethical reasons—were not able to investigate possible differences between responders and nonresponders. Therefore, we do not know to what extent this sample is representative of all MI patients. Because cross-sectional data were used in the study, no conclusions can be drawn about directions of influence. Although there is evidence that goal adjustment leads to a better well-being, rather than vice versa,<sup>24</sup> it may also be reasoned that an increased well-being may lead to a greater report of goal reengagement. The same applies to the cognitive coping strategies. Longitudinal studies are needed to clarify the directions of these associations. Still, whatever the directions of influence may be, this study clearly suggests that cognitive coping, goal adjustment processes, and serious disturbances are related issues, suggesting that both should play an important role in theoretical models and intervention strategies.

More specifically, the results suggest that the existence of depression symptoms after the experience of an MI may form an indication of the existence of maladaptive strategies of cognitive coping (ie, rumination, catastrophizing, and lack of positive refocusing) and problems in finding and engaging in new, meaningful and attainable goals. This indicates that both cognitive strategies and goal adjustment should play an important role in (preventive) intervention strategies. For example, short questionnaires assessing how people cognitively cope with and adjust their goals could help to recognize people at high risk of developing depression. Short group interventions could be provided to challenge maladaptive strategies such as rumination and catastrophizing and to supply more adaptive strategies such as learning how to refocus on more positive issues and how to reengage in new, meaningful goals. Recently, some evidence was found for the efficacy of a simple worry-reduction intervention<sup>32</sup> in which people learned to postpone their worries to a special 30-minute worry period each day. Future studies should investigate the effect of a comparable intervention on the closely related processes of rumination and catastrophizing.

Our study provides insight into the relationships of cognitive coping and goal adjustment strategies with symptoms of depression after the experience of a first-time acute MI. Although further studies are necessary and should use prospective designs and alternative forms of data collection (rather than self-report) to support these relationships, our results have important implications for the focus and content of intervention and prevention of mental health problems after the experience of an MI.

## NOTE

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